Session Partnerships: April 13th 11.00 hrs

4s2b: Food system transitions in deltas under pressure

INSECT PROBLEMS IN A CHANGING WORLD: REDUCE PESTICIDE USE BY BREEDING FOR INSECT RESISTANT PLANTS UNDER SALINITY STRESS

CAARLS L 1), ENIGIMI EF, STRIJKER M, VAN 'T WESTENDE W, VOORRIPS RE, VOSMAN B

1) Plant Breeding, Wageningen University & Research, The Netherlands

---

Climate change has profound effects on crop production, for example through more salt intrusion in deltas. In addition, pest and disease pressure will change. Both salinity and insect problems can cause large yield losses in plants. Currently, the main way to prevent losses caused by insects is through frequent application of pesticides. However, pesticide use is detrimental for humans and the environment, and alternatives are needed. To reduce pesticide use and to increase yield stability even under saline conditions, growers would benefit from plant varieties that are resistant against pests and tolerant to salinity stress. Importantly, abiotic and biotic stresses interact, and should not only be considered as independent problems. In this study, our objective was to identify pepper (Capsicum sp.) varieties that are salt-tolerant, and/or resistant to the silver leaf whitefly, Bemisia tabaci, one of the most damaging insects on pepper. In addition, we aimed to study the interaction of salinity stress and insect resistance. To this aim, we grew 26 pepper accessions in the greenhouse, applied a salt treatment for two weeks, and then evaluated the plants for resistance to B. tabaci. To study the effects of salinity stress on plants, plant weight and height were measured. Salt treatment had a clear effect on growth of plants, and resulted in biomass reduction for almost all pepper accessions. Three accessions show no or very little growth reduction when grown under salt, and could be further studied as potential salt-tolerant plants. Plant resistance to B. tabaci was investigated by measuring survival and reproduction of the insects. Significant differences were observed among accessions for adult survival and reproduction and five accessions with low survival of B. tabaci were selected as resistant. However, the salt treatment invariably resulted in increased survival and reproduction of whiteflies on all plants. In other words, plants that were resistant to whiteflies became susceptible when grown under salinity stress. Currently, we are studying which mechanisms underlie the reduction of plant defence under salinity stress. Importantly, our results indicate that problems with insects may increase in plants grown under salinity stress. However, for both salt tolerance and whitefly resistance there is genetic variation available that may be used to breed new cultivars with improved performance to both. Studying the interaction between both stresses may result in tools to grow plants that are stable resistant in changing conditions.

Keywords: Delta's, insects, salinity stress, pesticide reduction, plant breeding